

REMARKS/ARGUMENTS

The Office Action mailed July 19, 2006, has been received and reviewed. Claims 1, 3 through 18, 20 through 35, 40, 42, 43, and 45 through 51 are currently pending in the application. Claims 1, 3 through 6, 22, 25, 26, 28, 29, 31, 33, 34, 42, 43, and 45 stand rejected. Claims 7 through 18, 20, 21, 23, 24, 27, 30, 32, 35, 40, and 46 through 49 have been objected to as being dependent upon rejected base claims, but the indication of allowable subject matter in such claims is noted with appreciation. Applicants have amended claims 1, 22, 25, 29, 40, 42 and 51, added new claims 52-55, and respectfully request reconsideration of the application as amended herein.

Claim Objections

Claim 22 is objected to because it depends from canceled claim 2. Appropriate correction has been made.

35 U.S.C. § 112 Claim Rejections

Claim 40 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Appropriate correction has been made.

35 U.S.C. § 102(b) Anticipation Rejections

Anticipation Rejection Based on U.S. Patent No. 5,765,367 to Denoel et al.

Claims 1, 3 through 6, 22, 25, 26, 28, 29, 31, 33, 34, 42, 43, and 45 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Denoel et al. (U.S. Patent No. 5,765,367). Applicants respectfully traverse this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The 35 U.S.C. § 102(b) anticipation rejections of claims 1, 3 through 6, 22, 25, 26, 28, 29, 31, 33, 34, 42, 43, and 45 are improper because Doenel fails to either expressly or inherently describe each and every element as set forth in the claims.

Doenel describes a control system having a plurality of gas generators. Each gas generator comprises a combustion chamber containing a solid propellant. The chamber communicates via a passage with nozzles that enable the combustion gases produced by the generator to be distributed to a plurality of nozzles pointing in different directions and fitted with individual gates.

Claim 1, as amended herein, recites a “propulsion system, comprising: a pressure vessel containing a propellant, wherein the propellant comprises at least one solid propellant grain; at least one axial thrust valve in communication with the pressure vessel and configured for selectively releasing gases generated by combustion of the propellant within the pressure vessel to directly provide axial thrust; and at least one maneuver control valve in communication with the pressure vessel and configured for selectively releasing gases generated by combustion of the propellant within the pressure vessel to provide thrust for maneuvering, wherein the at least one axial thrust valve and the at least one maneuver control valve are operable in combination for simultaneous opening to rapidly reduce pressure within the pressure vessel to a degree sufficient to substantially extinguish combustion of the at least one solid propellant grain.”

Denoel fails to describe an axial thrust valve and a maneuver control valve which are operable in combination for simultaneous opening to rapidly reduce pressure within a pressure vessel to a degree sufficient to substantially *extinguish* combustion of a solid propellant grain. Rather, Denoel describes a generator with a flow rate for a time *t*. Multiple generators may be ignited simultaneously or in succession to obtain the desired flow rate. After igniting the generators, high temperatures gases exit the generator via a passage 20 (FIG. 2B). Flow rate and combustion time is extended only by igniting additional generators. After ignition, combustion continues until all of the fuel is consumed.

Therefore, it is respectfully submitted that Donoel fails describe each and every element of claim 1. Accordingly, it is respectfully submitted that the rejection to claim 1 should be withdrawn.

Claims 3 through 6, and 22 are each allowable, among other reasons, as depending from claim 1, which should be allowed.

Independent claim 25, as amended herein, recites a “method for extinguishing a solid propellant undergoing combustion within a pressure vessel of a propulsion system, comprising: providing a plurality of valves in communication with the pressure vessel; and opening the plurality of valves to rapidly reduce pressure within the pressure vessel to a degree sufficient to substantially extinguish combustion of the solid propellant.”

Denoel fails to describe opening a plurality of valves to rapidly reduce pressure within the pressure vessel to a degree sufficient to substantially extinguish combustion of a solid propellant. Rather, Denoel describes a generator with a flow rate for a time t . Flow rate and combustion time is extended only by igniting additional generators.

Therefore, it is respectfully submitted that Denoel fails describe each and every element of claim 25. Accordingly, it is respectfully submitted that the rejection to claim 25 should be withdrawn.

Claims 26 and 28 are each allowable, among other reasons, as depending from claim 25, which should be allowed.

Independent claim 29, as amended herein, recites a “propulsion system for propelling and maneuvering a vehicle, the system comprising: a pressure vessel containing at least one solid propellant charge for generating gases through combustion thereof; at least one valve in communication with the pressure vessel and with a thruster for providing axial thrust for the vehicle by release of combustion gases from the pressure vessel; a plurality of valves in communication with the pressure vessel and respectively in communication with thrusters located and oriented for providing maneuver control for the vehicle, wherein each valve of the plurality is selectively operable to effect at least one of pitch, yaw and roll control of the vehicle through release of combustion gases through a thruster; and wherein the at least one valve and the valves of the plurality are operable to open fully in combination to cause rapid depressurization of the interior of the pressure vessel to substantially extinguish combustion of the at least one solid propellant charge.”

Denoel fails to describe valves operable to open fully in combination to cause rapid depressurization of the interior of a pressure vessel to substantially extinguish combustion of a

solid propellant charge. Rather, Denoel describes a generator with a flow rate for a time t . Flow rate is extended only by igniting additional generators.

Therefore, it is respectfully submitted that Donoel fails describe each and every element of claim 29. Accordingly, it is respectfully submitted that the rejection to claim 29 should be withdrawn.

Claims 31, 33, and 34 are each allowable, among other reasons, as depending from claim 29, which should be allowed.

Independent claim 42, as amended herein, recites a “rocket motor, comprising; a pressure vessel; a solid propellant charge disposed within the pressure vessel for generating combustion gases; a selectively operable axial thrust valve for release of the combustion gases from the pressure vessel to directly provide axial thrust; and a plurality of selectively operable maneuver control valves for release of the combustion gases from the pressure vessel, wherein the axial thrust valve and the plurality of maneuver control valves are sized to effect a rapid depressurization of the pressure vessel during combustion of the solid propellant charge to terminate combustion thereof, with at least a portion of the solid propellant charge remaining, when the axial thrust valve and the plurality of maneuver control valves are fully open.

Denoel fails to describe valves sized to effect a rapid depressurization of a pressure vessel during combustion of the solid propellant charge to substantially extinguish combustion thereof. Rather, Denoel describes a generator with a flow rate for a time t . Flow rate is extended only by igniting additional generators.

Therefore, it is respectfully submitted that Donoel fails describe each and every element of claim 42. Accordingly, it is respectfully submitted that the rejection to claim 42 should be withdrawn.

Claims 43 and 45 are each allowable, among other reasons, as depending from claim 42, which should be allowed.

Anticipation Rejection Based on U.S. Patent No. 5,062,593 to Goddard et al.

Claims 25, 26, and 28 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Goddard et al. (U.S. Patent No. 5,062,593). Applicants respectfully traverse this rejection, as hereinafter set forth.

Goddard describes a plurality of solid propellant gas generators connected via a manifold to a plurality of nozzle valve clusters. At least one of the gas generators is connected to the manifold via a sequence valve which isolates that generator from the manifold until such time as it is desired to put that generator into operation. Once ignited, each gas generator burns continuously until all of the solid propellant fuel is consumed. (Col. 1, lines 45-47)

Independent claim 25, as amended herein, recites a “method for extinguishing a solid propellant undergoing combustion within a pressure vessel of a propulsion system, comprising: providing a plurality of valves in communication with the pressure vessel; and opening the plurality of valves to reduce pressure within the pressure vessel to a degree sufficient to substantially extinguish combustion of the solid propellant.”

Goddard fails to describe opening a plurality of valves to reduce pressure within the pressure vessel to a degree sufficient to substantially extinguish combustion of a solid propellant.

Rather, Goddard describes a gas generator which burns continuously until all of the solid propellant fuel is consumed.

Therefore, it is respectfully submitted that Goddard fails describe each and every element of claim 25. Accordingly, it is respectfully submitted that the rejection to claim 25 should be withdrawn. Claims 26 and 28 are each allowable, among other reasons, as depending from claim 25, which should be allowed.

Objections to Claims 7 through 18, 20, 21, 23, 24, 27, 30, 32, 35, and 46 through 49/Allowable Subject Matter

Claims 7 through 18, 20, 21, 23, 24, 27, 30, 32, 35, and 46 through 49 stand objected to as being dependent upon rejected base claims, but are indicated to contain allowable subject matter and would be allowable if placed in appropriate independent form. Although the indication of allowable subject matter is noted with appreciation, Applicants respectfully submit that claims 7 through 18, 20, 21, 23, 24, 27, 30, 32, 35, and 46 through 49 are allowable as presently presented.


ENTRY OF AMENDMENTS

The amendments to claims 1, 22, 25, 29, 40, 42 and 51 and new claims 52 through 55 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application.

CONCLUSION

Claims 1, 3 through 18, 20 through 35, 40, 42, 43, and 45 through 55 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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